Biological Evaluation and Effects Analysis for Proposed, Endangered, Threatened, and Sensitive (PETS) Plants

Two Eagle Vegetation Management Project

Wallowa-Whitman National Forest
La Grande Ranger District

Prepared by: _____ _____
Scott Schaefer — Date
Biological Science Technician

Reviewed by: _____ _____
Jerald Hustafa — Date
Wallowa Mountain Zone Botanist

INTRODUCTION

This Biological Evaluation (BE) analyzes effects or impacts from the proposed action and alternatives to plants listed threatened or endangered species, or proposed for listing, and Forest Service sensitive plant species. A BE is prepared for any planned, funded, executed, or permitted programs and activities for possible effects to proposed, threatened, endangered, or sensitive (TES) species. The BE is the means of conducting the review and documenting the findings (FSM 2672.4). The objectives of the BE are to

1) ensure that Forest Service actions do not contribute to the loss of viability of any native or desired non-native plant species or contribute to trends toward Federal listing of any species;
2) comply with the requirements of the Endangered Species Act that actions of Federal agencies not jeopardize or adversely modify critical habitat of Federally listed species; and
3) provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process

PROJECT DESCRIPTION

There are 4 alternatives developed and analyzed under the Two Eagle Vegetation Management Project (Two Eagle). They are briefly summarized in the table, below.

Table 1. Brief Summary of Alternatives

Alternative 1-No Action	The No Action is the baseline for comparing the other alternatives. With alternative 1, no treatments proposed in this analysis would occur in the analysis area. Other ongoing actions would continue.
Alternative 2-Proposed Action	This is the intial agency proposed action that would respond to the purpose and need and accomplish project objectives. Actions include: commercial harvest-1,507 acres non-commercial treatment- 1,026 acres fuels treatments post activity and natural fuels reduction-9,939 acres
Alternative 2M	This alternative was designed to respond to comments made during the scoping period which would optimize commercial removal of woody materials, and add additional wet meadow enhancement units to benefit mule deer habitat. Actions include: commercial harvest- 1,869 acres non-commercial treatment- 707 acres fuels treatments post activity and natural fuels reduction-9,650 acres meadow enhancement/lodgepole pine thinning – 27 acres wet meadow enhancement/side channel repair – 3 acres
Alternative 3	This alternative was designed to was developed to respond to

issues which arose as a result of Scoping the Proposed Action regarding old growth and moist forests, temporary roads, landscape connectivity, and fire behavior. The changes were identified to meet the needs of resources were retention of stands in moist habitat, reduction of temporary road construction, and eliminating treatments within connective corridor units.
Actions include:
commercial harvest-1,166 acres
non-commercial treatment- 905 acres
fuels treatments post activity and natural fuels reduction-7,887 acres

Each action alternative includes road work, including temporary road construction, road maintenance, road decommissioning, road reconstruction, and culvert replacement.

Botanical Project Design Features and Mitigations

To minimize or eliminate deleterious impacts to TES plants or potential TES/Native plant habitat, the following Project Design Features have been incorporated into the action alternatives.

- To protect sensitive plant species, known population locations will be excluded from ground disturbing treatments by implementing a no-disturbance buffer around each site of a size adequate to provide protection from implementation impacts. The size of buffer will be determined based on the species and size of the population. Known occurrences will be depicted as Areas-to-Protect on implementation maps. These areas will be identified on the ground as needed for project implementation. Surveys will be performed in the 2018 field season to more clearly ascertain the extent of documented sensitive species presense in the vicinity of proposed meadow enhancement projects.

- To protect potential sensitive plant habitats, avoid ground disturbing activities (piling slash, decking, motorized travel, parking, staging operations) on previously undisturbed non-forested terrain.

- To protect native plant habitat and potential habitat for sensitive plant species from competition with undesirable non-native species, follow Forest Plan and Regional guidelines for including weed spread prevention measures in implementation contracts and for utilizing native species for restoration and erosion control work.

- To protect native plant habitat and potential habitat for sensitive plant species in riparian areas from deleterious thermal effects of fire, project fire ignition will not occur within Riparian Habitat Conservation Areas (RHCAs); but low intensity prescribed fire will be allowed to back into the these areas.

- To protect native plant habitat and potential habitat for sensitive plant species in riparian areas from mechanical impacts, follow PACFISH/INFISH and Forest Plan standards and guidelines for protecting RHCAs from ground disturbing activities.

- To protect native plant habitat and potential habitat for sensitive plant species from the potential cumulative effects of soil disturbance and erosion as a result of vegetation management activities rehabilitate landings and skid trailsafter completion of timber harvest activities where needed to minimize colonization by undesirable plant species and to minimize bare soil; use BMPs (e.g. scattering slash, seeding, construction of waterbars).

AFFECTED ENVIRONMENT

This BE considers the following species recorded in the Pacific Northwest Region Regional Forester's Sensitive Species list (2015 - http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy), for plant species known or with potential to occur on the Wallowa-Whitman National Forest (Appendix A);

The Forest Geographic Information System (GIS), rare plant data base (NRIS), and District files were examined to identify whether any threatened, endangered or sensitive (TES) plants or potential habitat are known in or near the analysis area boundary (PAB).

Based on present available information, it was determined that the analysis area does contain potential TES plant habitat. A pre-field review of district data and the Wallowa-Whitman sensitive plant list shows that the analysis area contains suitable habitat for 13 TES plants. Table 2 includes an assessment by the primary investigator, Penny Hall, as to the likelihood of these species occurring in the analysis area. Hall's assessment is based on her observations of the Two Eagle analysis area and her previous survey experience on this part of the Wallowa-Whitman Forest. She also performed a soils GIS mapping exercise, with the help of soils scientist Mary Young, to analyze the potential habitat for TES species in the project area.

Table 2. Pre-field potential TES species checklist for Two Eagle analysis area

Scientific name And Code	Common name	Habitat summary	Primary investigator assessment
Achnatherum wallowaensis ACWA	Wallowa ricegrass	Basalt scablands and lithosols; shallow rocky soils, sometimes w/stiff sage, strict buckwheat, and ponderosa pine surrounding	Habitat could exist
Botrychium crenulatum BOCR	Crenulate moonwort	Moist meadows, edges of ponds and lakes, grassy forests. Some species have been found under various species of conifer trees. Sandy soils, or areas moist in spring. In forested areas, often	Habitat is present in the area, especially along the larger creeks. Most likely species would be B. minganense and B. crenulatum. Potential
Botrychium minganense BOMI	Gray moonwort		

Scientific name And Code	Common name	Habitat summary	Primary investigator assessment
Botrychium montanum BOMO	Mountain grape-fern	associated with queens-cup bead lily or strawberries.	habitat identified in multiple units.
Botrychium pedunculosum BOPE4	Stalked moonwort	Mountain meadows, roadsides, brushy secondary woodlands, and open to closed canopy forests.	Species occurs near Eagle Creek adjacent to Two Color Guard Station.
Carex cordillerana(syn. C. backii) CACO81	Cordilleran sedge	Dry forests and riparian woods. Mid-elevations.	Potential habitat is present in the project area.
Carex retrorsa CARE4	Retrorse sedge	Swamps, wet thickets, often along streams, marshes, sedge meadows, shores of streams, ponds, and lakes. Our populations are on basalt and other volcanic derived soils.	Known previous location on Eagle Creek, has not been relocated. Would be within riparian protective buffers.
Cypripedium fasciculatum CYFA	Clustered lady's-slipper	Forest, grand fir to Ponderosa pine, and warm riparian forests. Populations generally found in 60-100% shade. Ultra basic soils, granitics, schists, limestone, and quartz-diorite. Rocky to loamy soils in damp to dry sites. Seeps/springs.	Historic collection from adjacent Gold King Creek in East Eagle drainage. Has not been relocated.
Listera borealis LIBO4	Northern twayblade (orchid)	Mossy, wet, coniferous woods.	Suitable habitat in 3 veg treatment units.
Ophioglossum pusillum OPPU3	northern adderstongue (fern)	Seasonally wet areas in meadows and moist woods.	Species occurs near Two Color Guard Station in proposed meadow enhancement area.
Pellaea bridgesii PEBR5	Bridges' cliff-brake (fern)	Dry rock outcrops, granitics at moderate to higher elevations. Loose talus slopes.	Species occurs north of analysis area. Did not encounter specimens during surveys.
Phacelia minutissima PHMI7	Dwarf phacelia	Moist meadow and seep edges, or on vernally wet open meadows and barren slopes. Reported to occur with aspen in other areas. Gravely, clay-loam, well-drained soils. Populations in plan area on basalt or marine sediments.	Suitable habitat was not seen. However, it could occur on moderately sloping dry grassland with seepage spots, if this habitat is present. Specimens not discovered during surveys.

Scientific name And Code	Common name	Habitat summary	Primary investigator assessment
Pinus albicaulis PIAL	whitebark pine	Rocky well drained sites on sheltered north-facing slopes and basins	Species occurs in treatment units 58, 60, 63, and 78.
Salix farriae SAFA	Farr's Willow	Along stream banks and spring seeps	Suitable habitat is present but no specimens were discovered during survey

Two Eagle Project Surveys

Field surveys were conducted during the summer of 2017 to determine the presence of TES species suspected to occur in the analysis area. Survey areas were aimed toward forested habitats where ground disturbing timber removal would occur and to non-forest habitats within prescribed burn units. Survey units were identified based on several criteria: areas where ground disturbing activities were proposed to occur and areas that had not been previously surveyed.

Although not every acre of every treatment unit was surveyed, the survey design was commensurate with the perceived level of risk of impacting the target species with treatment activities. Approximately 20% of the acres proposed for commercial harvest were surveyed in 2017 with approximately 10% of the acres proposed for prescribed fire also covered. The selected survey areas were designed to be representative of analysis area habitat and the proposed silvicultural and prescribed fire treatments. The proposal for alternative 2M meadow enhancement projects was offered late in the 2017 field season so that the optimum time to survey for the sensitive species in the vicinity of these projects was passed. Surveys will be conducted in the area where these projects are proposed in the 2018 field season in the event that any of these elements are adopted in the final decision memo for Two Eagle.

Results

The only TES plant species found in the analysis area were *Albatrellus avellaneus, Botrychium pedunculosum, Ophioglossum pusillum,* and *Pinus albicaulis.* Table 3 summarizes data for the four documented sensitive plant occurrences and their proximity to proposed activities.

Table 3. Sensitive Plant Site Information

Site Name	Number of plants	Proximity to Proposed Activities
ALAV *Albatrellus avellaneus*	3	Found in Unit 45 and adjacent to proposed down cutting side-channel restoration project area
BOPE4 *Botrychium pedunculosum*	8	Found in proposed meadow enhancement project area
OPPU3 *Ophioglossum pusillum*	12	Found in proposed meadow enhancement project area

Site Name	Number of plants	Proximity to Proposed Activities
PIAL *Pinus albicaulis*	Few individuals	Found in Timber Units 58,60,63,78

EFFECTS ANALYSIS

Direct, indirect, and cummulative effects will now be discussed. Direct and indirect effects will be described where sensitive species occur within a proposed project areas. Table 4 is a table showing present and reasonably foreseeable future activities within the project area. Potential measureable cumulative effects related to Two Eagle activities are not expected as discussed in the table.

Table 4. Cummulative Effects Table

Project	Potential Effects	Overlap in:		Measurable Cumulative Effect?	Effects
		Time	Space		
Noxious Weed Management W-W Invasive Species Treatment ROD	Reduction of invasive species competition	Yes	Yes	Slight beneficial potential	If invasive species are in area/habitat of sensitive species – potential to decrease competition for site resources. Mitigations to inhibit TES plants from being treated with herbicide are incorporated in the Forest Invasives EIS.
Veg Management	Ground disturbance/habitat damage	Yes	No	No	Eagle Creek Fire Salvage logging is occuring in the downstream of Two Eagle. No overlap in logging activities will occur.
Fuels Reduction & Rx Burning	Habitat damage.	No	No	No	There are no planned Rx burning projects
Special Uses: Phillips - Ingle Ditch	Ground disturbance/habitat damage	Yes	Yes	No	Ditch activities occur only on the historic estabished ditch footprint.
Recreation – Eagle Creek Wild & Scenic River	Ground disturbance/habitat damage	Yes	Yes	No	Ongoing activities like recreation and fuelwood gathering have the potential to impact sensitive plant populations and habitat,
Recreation- Dispersed Camping		Yes	Yes	No	
Recreation- Snowmobile Trails		No	Yes	No	

Recreation -Firewood Cutting		Yes	Yes	No	thus cumulative impacts are possible. Impacts from these actions are expected to be low, as recreation impacts have not been noted in the past, and the area in which three of the sensitive plant sites are located are within the RHCA fuelwood restriction zone.
Recreation – OHV Use		Yes	Yes	No	
Recreation – Two Color Guard Station		Yes	Yes	No	
Recreation - Two Color Campground, Boulder Park Recreation Residences (7 cabins), and Boulder Park Campground		Yes	Yes	No	
Roads & Trails – Travel Management Plan	Decrease in vehicle traffic	Yes	Yes	Potential benefit	If cross-country OHV travel is restricted, the risk of plant damage would decrease.
Road Maintenance – 7700, 7755, & 6700 Roads	Ground disturbance/habitat damage	Yes	Yes	No	Road maintenance on current road prism would not impact plant communities.
Roads – Danger Tree Removal	Ground disturbance/habitat damage	Yes	Yes	No	Danger tree removal would only occur in current high human use areas.
Grazing Allotments	Browse and/or trampling of sensitive plant species. Ground disturbance/habitat damage	Yes	Yes	No	Grazing is excluded from the meadow areas along Eagle Creek where the three sensitive plants are documented. Grazing does occur where white bark pine is located in four timber units. Grazing is not expected to impact these existing individuals.
Wildlife Enhancement – Bald Angel Closure Area	Decrease in vehicle/human traffic	Yes	Yes	Possible slight benefit	Occassional restricting access would reduce potential trampling of plants.
Mining	Ground disturbance/habitat damage	No	No	No	No approved plans of operation
Private Land Activities	Ground disturbance/habitat damage	Yes	Yes	No	No known plans for harvest, fuels reduction, road construction, or grazing.

Endangered and Threatened Species

The U.S. Fish and Wildlife Service provides species lists for organisms classified as endangered, threatened, or candidates for listing by county at their website: http://www.fws.gov/oregonfwo/Species/Lists/RequestList.asp. *Thelypodium howellii spectabilis*, Howell's spectacular thelypody, is the only 'threatened' plant species in Union County. There is no habitat for, and it is not found in the vicinity of the project area. Whitebark pine, *Pinus albicaulis*, is the only 'candidate' for listing and will be discussed in the following analysis. Because there is no Endangered or Threatened Species habitat or plants in the analysis area, this project would have no effect to federally threatened or endangered (TE) plant species.

Documented Sensitive Species in Two Eagle (From Table 3)

Albatrellus avellaneus (fungus)
Albatrellus avellaneus is a fungus endemic to coastal lowlands in Oregon. It was previously not known to occur in the Wallowa-Whitman National Forest, but was discovered in Two Eagle near Two Color Guard Station in 2017 by USFS botanist Paula Brooks. This mycorrhizal species is slow to mature and fruits infrequently on the ground under conifers in October-January. It is primarily associated with large Douglas fir and spruce where it forms symbiotic associations with the fine root systems of plants, growing out into the soil matrix. (Lau)

Direct and Indirect Effects
Removal of the host conifer species by logging, fire, road construction, or other management activities are the most serious threats to *Albatrellus avellaneus*. There is a commercial timber unit 45 in the area where this fungus was observed. Alternative 2M has a proposed meadow enhancement activity in the vicinity involving transplanting sod into a down-cutting meadow side channel. All of the action alternatives include commercial harvest unit 45.

Mitigation measures for the harvest unit would be to designate an Areas-to-Protect where the fungus is located including a buffer around its host conifers. Surveys will be performed during the 2018 field season in order to assess the extent of the fungus occurance. Ground disturbance and travel will be excluded from this area. Mitigation measures for the meadow enhancement project will be to ensure that no sod would be taken from this Areas-to-Protect.

Cumulative Effects
Since no activities will occur in the area where this fungus occurs, there will be no measureable cumulative effects.

Determination and Conclusion
No removal of host conifer species would occur, including a buffer area, where Albatrellus avellaneus is documented. A designated Areas-to-Protect will be established. Because the extent of the fungus occurance is difficult to pinpoint the project may impact individuals or their habitat (MIIH).

Botrychium pedunculosum (Stalked moonwort)
Botrychium pendunculosum is found on floodplain terraces near perennial streams, mossy granite ledges in the splash zone of streams, mesic meadows and damp ground in forested settings. It has been affiliated with semi-permanently flooded marshy meadows and small forb dominated openings adjacent to, or within Englemen's spruce, lodgepole pine, or grand fir stands. There is a documented site for this moonwort in the area where the meadow enhancement activities of alternative 2M is proposed.

Direct and Indirect Effects
If alternative 2M is selected, the meadow restoration project would take place on the known *Botrychium pedunculosum* site. This species appears to do well in both shaded and open canopy settings. Therefore, the actions of the tree canopy removal in the area would have a neutral effect on the moonwort. The purpose of the project is to enhance mule deer habitat. An increase of mule deer presence could have an indirect effect of higher herbivory and deer traffic. Activites proposed with the meadow enhancement project would be all hand work, minimizing ground disturbance to the surrounding habitat.

Mitigation measures for the meadow enhancement project would be to designate an Areas-to-Protect where the moonwort is located. Surveys will be performed during the 2018 field season in order to assess the extent of the species occurance.

Cumulative Effects
Since no activities will occur in the area where this species occurs, there will be no measureable cumulative effects.

Determination and Conclusion
If alternative 2M is selected, the mitigation measures proposed would make it unlikely to have an effect from the project except potentially on individual plants. (MIIH)

Ophioglossum pusillum (northern adderstongue- fern)
This fern is found in boggy meadows with seeping groundwater, borders of marshes, and moist, sunny woodland clearings. It appears to need light from an open canopy and so to be threatened by succession. There is a documented site for this fern in the area where the meadow enhancement activities of alternative 2M is proposed. If another of the alternatives are selected, there would be no activity effecting this species.

Direct and Indirect Effects
Activites proposed with the meadow enhancement project would be all hand work, minimizing ground disturbance. The opening of the canopy could decrease the threat of succession to this species.

Mitigation measures for the meadow enhancement project would be to designate an Areas-to-Protect where the fern is located. Activities in the surrounding area, which could be considered potential habitat, would be restricted to periods when the ground is not wet and compactable.

Cumulative Effects

Since no activities will occur in the area where this fern occurs, there will be no measureable cumulative effects.

Determination and Conclusion
If alternative 2M is selected, the meadow restoration project would take place on the known *Ophioglossum pusillum* site. However, with the mitigation measures in place it would be unlikely to have an effect except potentially on individual plants. (MIIH)

Pinus albicaulis *(*whitebark pine*)*
In the Blue Mountains of eastern Oregon and Washington, whitebark pine codominates with subalpine fir between 7,600 and 8,500 feet. Whitebark pine individuals have been located in three commercial harvest units and in one non-commercial treatment unit. There is a proposed temporary road in one of the commercial units. This unit, along with the road, are excluded from alternative 3. The non-commercial treatment is also excluded from alternative 3.

Direct, Indirect and Cumulative Effects
Removal of competing conifers would be advantageous for the trees and seedlings of this species. Measureable cumulative effects are not expected to occur because of the small number of trees present and the ability to identify and avoid disturbance of each individual and its direct surroundings.

Mitigation measures to protect whitebark pine are to carefully note the locations of trees and any seedlings of this species and designate an Areas-to-Protect where disturbance and harvest of these few solitary individuals are excluded.

Determination and Conclusion
The activities associated with projects in Two Eagle with the implementation of the mitigation measures would have no negative impacts on whitebark pine. (NI)

Potential Sensitive Species in Two Eagle (From Table 2)

Achnatherum wallowensis **(Wallowa ricegrass)**
Although this species has not been documented on the Whitman Ranger District, it is believed that habitat could exist. Habitat is described as basalt scablands and lithosols; shallow rocky soils sometime with stiff sage, strict buckwheat and ponderosa pine surrounding the openings. This type of habitat exists in the analysis area. There are no activities planned in scabland habitat so no specific surveys were done in those areas.

Direct, Indirect and Cumulative Effects
Impacts to habitat are not likely to occur because no activities are planned in scablands. Mitigations are included that avoid disturbance (i.e. roads, landing piles, etc) to this type of habitat. Other possible actions within the analysis area such as wildfire and ongoing activities like recreation, fuelwood gathering and livestock grazing have the potential to impact scabland habitat and therefore have the potential to impact any undetected populations in the analysis area. Any potential impacts to undetected populations are unlikely as this plant has a low likelihood to occur in the analysis area and would be small; therefore, the cumulative impacts would not

increase significantly.

Determination and Conclusion
This project is expected to have no impact (NI) to *Achnatherum wallowensis*, due to its low likelihood of occurrence.

Botrychium crenulatum, B. minganense, B. montanum
There are no known *Botrychium* populations of these species within the analysis area but there is potential habitat.

Direct, Indirect and Cumulative Effects
Botrychium species are known from mesic areas that have limited potential to be directly impacted by vegetation management activities as described for Two Eagle because riparian areas and other mesic features are protected by INFISH buffers. Suitable habitat in Two Eagle was searched with no plants located. Other possible actions within the analysis area such as wildfire, road maintenance and ongoing activities like recreation, fuelwood gathering and livestock grazing may have the potential to impact undetected *Botrychium* populations. Any potential effects to undetected populations are unlikely because these *Botrychium* spp. are not likely to occur in the analysis area; therefore, the cumulative impacts would not increase significantly.

Determination and Conclusion
This project is expected to result in no impact (NI) to *Botrychium crenulatum, B. minganense,* and *B. montanum*.

Carex cordillerana (syn=Carex backii) (*Cordilleran sedge*)
Carex cordillerana is a small tufted sedge that grows largely in upland plant communities. Eight occurrences were discovered near Two Eagle in 2008 during surveys for the Snow Basin (Smith, Yates) and Boulder/Eagle Allotment Management Plan projects.

Direct and Indirect Effects
It is possible that undetected *Carex cordillerana* occurrences may exist in the analysis area.. Mechanical damage from tree felling, skidding, decking, and slash piling would likely severely impact populations. An indirect effect of harvest could be that opening of the canopy through harvest could have beneficial effects on this species allowing more light penetration. Similarly, the reduction of competitive vegetation through prescribed fire is also expected to benefit the species. Any impacts to undetected occurrences are not expected to lead to a loss of population viability of the species in the project analysis area.

Cumulative Effects
Grazing impacts could occur if the timing of grazing was during late spring or early summer. It is possible that Two Eagle activities such as harvest and prescribed burning could open up suppressive vegetative cover and promote the plant's growth, abundance and vigor making it both more available and desirable to livestock. As with the majority of sensitive plant species, conclusive information as to their growth habits and how various influences (natural and human) may benefit or negatively impact is largely unknown. Timing of grazing is an activity within the control of grazing allotment administration and can be incorporated into annual operating

instructions if monitoring indicates an adverse impact.

Other possible events within the analysis area such as severe wildfire or ongoing activities like recreation and fuelwood gathering have the potential to impact the *Carex cordillerana* populations and habitat, thus cumulative impacts are possible. Impacts from these actions are expected to be low, as recreation impacts have not been noted in the past, and the area would serve poorly for fuelwood gathering. The reduction in fuels and competing vegetation from prescribed fire in around *Carex cordillerana* occurrences may help reduce the severity of impact from wildfire that may occur in the next 10-20 years.

Determination and Conclusion
This project may impact individuals or habitat of *Carex cordillerana*, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species (MIIH).

***Carex retrorsa* (retrose sedge)**
This sedge is documented on the Whitman Ranger District (East Pine Creek and Eagle Creek) and is often found along streams, marshes, sedge meadows and shores of streams, ponds and lakes. Surveys of this type of habitat were not specified but observations were made of riparian areas when encountered. There are no mechanical activities planned in riparian areas, as streams and other wetland features are protected by INFISH buffers.

Direct, Indirect and Cumulative Effects
Impacts to habitat are not likely to occur because no mechanical activities are planned in riparian areas. INFISH buffers are included in project design to protect aquatic features. Other possible actions within the analysis area such as wildfire and ongoing activities like recreation, fuelwood gathering and livestock grazing have the potential to impact riparian habitat and possible undetected *Carex retrorsa* (Carex, 2008). Any potential effects to undetected populations are unlikely; therefore the cumulative impacts would not increase.

Determination and Conclusion
Project activities would have no impact (NI) to *Carex retrorsa* because the habitat for this plant would not be affected directly or indirectly.

***Cypripedium fasciculatum* (Clustered lady-slipper)**
This member of the orchid family occurs in coniferous forest, often on northerly aspects with filtered sunlight. It occurs around springs, and along riparian zones. Although there are no documented sites on the forest, a historic (1957) record from an area adjacent to the Two Eagle analysis area (East Eagle drainage) does exist and has led to numerous attempts in recent years to relocate the species. It has never been relocated.

Direct, Indirect and Cumulative Effects
Activities that remove canopy in large areas or patches close to *C. fasciculatum* populations could alter the microclimate of nearby sites. Other possible actions within the analysis area such as prescribed burning, recreation, fuelwood gathering have the potential to impact any undetected populations of *Cypripedium fasciculatum* (Doherty). Any potential effects to

undetected populations are unlikely and would be small; therefore, the cumulative impacts would not increase significantly.

Determination and Conclusion
Because the existence of the plant in the analysis area is very unlikely, this project would have no impact to this orchid (NI).

Listera borealis (*Northern twayblade*)
Habitat for this orchid is moist rich humus of mossy coniferous forests. There are no known sites in the analysis area, , but habitat exists where undetected occurances could exist.

Direct, Indirect and Cumulative Effects
Impacts to habitat are not likely to occur because no mechanical activities are planned in riparian areas. INFISH buffers are included in project design to protect aquatic features. Other possible actions within the analysis area such as wildfire and ongoing activities like recreation, fuelwood gathering and livestock grazing have the potential to impact riparian habitat and possible undetected *Listera borealis*. Any potential effects to undetected populations are unlikely; therefore the cumulative impacts would not increase.

Determination and Conclusion
Project activities would have no impact (NI) to *Listera borealis* because the habitat for this plant would not be affected directly or indirectly.

Pellea bridgesii (*Bridge's Cliff-brake*)
There are no known sites in the analysis area, but habitat exists where undetected occurances could exist.

Direct, Indirect and Cumulative Effects
This species is found mostly on rock outcrops in the analysis area and these habitats do not have machinery operating on the site. The only potential impact would be from prescribed fire that had escaped into wildland fire characteristics. Other possible actions within the analysis area such as wildfire, and ongoing activities like recreation, fuelwood gathering have little potential to impact any undetected *Pellea bridgesii.* Any potential effects to undetected populations are unlikely and would be small; therefore the cumulative impacts would not increase significantly.

Determination and Conclusion
This project would have no impact (NI) to *Pellea bridgesii*.

***Phacelia minutissima* (dwarf phacelia)**
Suitable sites were surveyed for this species, but none were found.

Direct, Indirect and Cumulative Effects
This species does not occur in the general forest so there would be no impacts to potential habitat or undiscovered populations from project activities. Other possible occurances within the analysis area such as wildfire and ongoing activities like recreation, fuelwood gathering and

livestock grazing have the potential to impact any undetected dwarf phacelia populations. Any potential effects to undetected populations are unlikely and would be small; therefore the potential for cumulative impacts are unlikely.

Determination and Conclusion
This project would have no impact (NI) to *Phacelia minutissima.*

***Salix farriae* (Farr's willow)**
Suitable sites were surveyed for this species, but none were found.

Direct, Indirect and Cumulative Effects
This species was not discovered during surveys. It would only occur in RHCA habitat in which the only proposed activities are the meadow enhancement projects in alternative 2M. Surveys will be performed during the 2018 field season in the vicinity of these proposed projects in order to assess the extent of the species occurance. Any potential effects to undetected populations are unlikely and would be small; therefore the cumulative impacts would not increase significantly.

Mitigation measures for the meadow enhancement project would be to designate an Areas-to-Protect if the willow is detected in the 2018 survey.

Determination and Conclusion
This project would have no impact (NI) to *Salix farriae.*

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Appendix A – Sensitive Species Lists

2015 Regional Forester's Sensitive Plant List

Taxon	Species Code	Scientific Name	Common Name	WAW	LAG	2 Eagle
BR	ANMI8	Anastrophyllum minutum	Liverwort	D		
BR	ANJU4	Anomobryum julaceum	Moss	D		
BR	ANJU	Anthelia julacea	Liverwort	D		
BR	BALY	Barbilophozia lycopodioides	Liverwort	D	No habitat	No habitat
BR	ENBR2	Encalypta brevipes	Moss	S		
BR	ENFA2	Entosthodon fascicularis	Moss	S		
BR	HAFL9	Harpanthus flotovianus	Liverwort	D		
BR	JUPO3	Jungermannia polaris	Liverwort	D	S	
BR	LOGI3	Lophozia gillmanii	Liverwort	D		
BR	MNBL70	Mnium blyttii	Moss	D		
BR	ORBO	Orthotrichum bolanderi	Moss	S		
BR	OREU	Orthotrichum euryphyllum	Moss	D		
BR	ORHO3	Orthotrichum holzingeri	Moss	S		
BR	ORPE3	Orthotrichum pellucidum	Moss	D		
BR	PEQU7	Peltolepis quadrata	Liverwort	D	S	
BR	POCA45	Pohlia cardotii	Moss	S		
BR	PRQU2	Preissia quadrata	Liverwort	D		
BR	PSTR5	Pseudocalliergon trifarium	Moss	S		
BR	PSTE11	Pseudoleskeella tectorum	Moss	S		
BR	PTPU2	Ptilidium pulcherrimum	Liverwort	D	S	
BR	SCCI5	Schistidium cinclidodonteum	Moss	D	S	
BR	SCMA10	Scouleria marginata	Moss	S		
BR	TEGE	Tetraphis geniculata	Moss	S	p	
BR	TOTOT	Tortella tortuosa var. tortuosa	Moss	S		
BR	TOMU70	Tortula mucronifolia	Moss	S	p	
BR	TRQU	Tritomaria quinquedentata	Liverwort	S		
FU		Albatrellus avellaneus	Fungus	D	D	D
FU	HYMI11	Hydnotrya michaelis	Fungus	D		
FU	RHBA7	Rhizopogon bacillisporus	Fungus	S		
FU	RHSU17	Rhizopogon subclavitisporus	Fungus	D		
LI	COCU5	Collema curtisporum	Lichen	D		
LI	LEBU5	Leptogium burnetiae	Lichen	S		
LI	THMUO	Thelenella muscorum var. octospora	Lichen	S		
VA	ACWA	Achnatherum wallowaense	Wallowa ricegrass	D	p	P

VA	ACROT	Acomastylis rossii ssp. turbinatum	Slender-stemmed avens	D		
VA	ALGEG	Allium geyeri var. geyeri	Geyer's onion	D	No habitat	
VA	ASVI10	Asplenium viride	Green spleenwort	D		
VA	BOHA3	Boechera hastatula	Hells canyon rockcress	D		
VA	BOAS2	Botrychium ascendens	Upward-lobed moonwort	D		
VA	BOCA5	Botrychium campestre	Prairie moonwort	D	S	
VA	BOCR	Botrychium crenulatum	Crenulate moonwort	D	D	P
VA	BOHE5	Botrychium hesperium	Western moonwort	D	S	
VA	BOLI7	Botrychium lineare	Slender moonwort	D	S	
VA	BOLU	Botrychium lunaria	Moonwort	D	D	
VA	BOMO	Botrychium montanum	Mountain grape-fern	D	D	S
VA	BOPA9	Botrychium paradoxum	Twin-spiked moonwart	D	S	
VA	BOPE4	Botrychium pedunculosum	Stalked moonwort	D	D	D
VA	BUAM2	Bupleurum americanum	Bupleurum	D	P	
VA	CAMAM	Calochortus macrocarpus var. maculosus	green-band mariposa-lily	D	P	
VA	CANI	Calochortus nitidus	Broad-fruit mariposa-lily	S	P	
VA	CAAT8	Carex atrosquama	Blackened sedge	D	No habitat	
VA	CACA12	Carex capillaris	Hairlike sedge	D	p	
VA	CACA13	Carex capitata	Capitate sedge	S	p	
VA	CACO81	Carex cordillerana	Cordilleran sedge	D	D	S
VA	CADI4	Carex diandra	Lesser panicled sedge	S	S	
VA	CADU6	Carex duriuscula	Needleleaf sedge	S		
VA	CAGY2	Carex gynocrates	Yellow bog sedge	D	P	
VA	CAID	Carex idahoa	Idaho sedge	S	S	
VA	CALAA	Carex lasiocarpa var. americana	Slender sedge	D	S	
VA	CAME9	Carex media	Intermediate sedge	D		
VA	CAMI16	Carex micropoda	Pyrenaean sedge	D		
VA	CANA2	Carex nardina	Spikenard sedge	D		
VA	CAPE5	Carex pelocarpa	New sedge	D		
VA	CARE4	Carex retrorsa	Retrorse sedge	D	S	S
VA	CASA10	Carex saxatilis	Russet sedge	D		
VA	CASU7	Carex subnigricans	Dark alpine sedge	D		

VA	CAVE5	Carex vernacula	Native sedge	D		
VA	CAFLR	Castilleja flava var. rustica	Rural paintbrush	D		
VA	CAFR8	Castilleja fraterna	Fraternal paintbrush	D		
VA	CARU8	Castilleja rubida	Purple alpine paintbrush	D		
VA	CAVI9	Castilleja viscidula	Sticky paintbrush	D		
VA	CHFE	Cheilanthes feei	Fee's lip-fern	D		
VA	CIBU	Cicuta bulbifera	Bulb-bearing water-hemlock	S		
VA	COTE13	Comastoma tenellum	Slender gentian	S		
VA	CRSI2	Cryptantha simulans	Pine woods cryptantha	D		
VA	CRTH3	Cryptantha thompsonii	Thompson's cryptantha	D		
VA	CRST2	Cryptogramma stelleri	Steller's rockbrake	D		
VA	CYLUL	Cyperus lupulinus ssp. lupulinus	A cyperus	D		
VA	CYFA	Cypripedium fasciculatum	Clustered lady's-slipper	D	S	P
VA	ELBR5	Elatine brachysperma	Short seeded waterwort	S	S	
VA	ELBO	Eleocharis bolanderi	Bolander's spikerush	D	D	
VA	ERDA3	Erigeron davisii	Engelmann's daisy	D	P	
VA	ERDI3	Erigeron disparipilus	White cushion erigeron	D	P	
VA	ERHY6	Erythranthe hymenophylla	Membrane-leaved monkeyflower	D		
VA	ERPA16	Erythranthe patula	Stalk-leaved monkeyflower	D		
VA	EUME17	Eurybia merita	Arctic aster	D		
VA	GEPR3	Gentiana prostrata	Moss gentian	S		
VA	HECU3	Heliotropium curassavicum	Salt heliotrope	S	P	
VA	ISMI4	Isoetes minima	Midget quillwort	D		
VA	JUTRA2	Juncus triglumis var. albescens	Three-flowered rush	D		
VA	KOMY	Kobresia myosuroides	Bellard's kobresia	D		
VA	KOSI2	Kobresia simpliciuscula	Simple kobresia	D	P	
VA	LIAR6	Lipocarpha aristulata	Aristulate lipocarpha	D		
VA	LIBO4	Listera borealis	Northern twayblade	D	S	P

VA	LOER2	Lomatium erythrocarpum	Red-fruited lomatium	D		
VA	LOGR2	Lomatium greenmanii	Greenman's desert parsley	D		
VA	LOPA8	Lomatium pastoralis	Meadow lomatium	D		
VA	LYCO3	Lycopodium complanatum	Ground cedar	D	D	
VA	MUMI2	Muhlenbergia minutissima	Annual dropseed	S	S	
VA	OPPU3	Ophioglossum pusillum	Adder's-tongue	D	D	D
VA	PAPO12	Packera porteri	Porter's butterweed	S		
VA	PEBR5	Pellaea bridgesii	Bridges' cliff-brake	D	D	P
VA	PEDEV2	Penstemon deustus var. variabilis	Variable hot-rock penstemon	S		
VA	PHMI7	Phacelia minutissima	Dwarf phacelia	D	D	P
VA	PHMU3	Phlox multiflora	Many-flowered phlox	D	D	
VA	PIAL	Pinus albicaulis	Whitebark pine	D	D	D
VA	PIFL2	Pinus flexilis	Limber pine	D		
VA	PLOB	Platanthera obtusata	Small northern bog-orchid	D	S	
VA	PLOR3	Pleuropogon oregonus	Oregon semaphoregrass	S	P	
VA	PODI	Potamogeton diversifolius	Rafinesque's pondweed	S	S	
VA	PYDE	Pyrola dentata	Toothleaf pyrola	S		
VA	PYSC4	Pyrrocoma scaberula	Rough pyrrocoma	D		
VA	ROCO3	Rorippa columbiae	Columbia cress	S	S	
VA	RORA	Rotala ramosior	Lowland toothcup	S	S	
VA	RUBA	Rubus bartonianus	Bartonberry	D		
VA	SAFA	Salix farriae	Farr's willow	D		P
VA	SANI8	Salix nivalis	Snow willow	D		P
VA	SAWO	Salix wolfii	Wolf's willow	D	P	P
VA	SAADO2	Saxifraga adscendens ssp. oregonensis	Wedge-leaf saxifrage	D		
VA	SUVI	Suksdorfia violacea	Violet suksdorfia	S	P	
VA	SWPE	Swertia perennis	Swertia	D		
VA	THAL	Thalictrum alpinum	Alpine meadowrue	D		

VA	THEU	Thelypodium eucosmum	Arrow-leaf thelypody	S	P	
VA	TOMO	Townsendia montana	Mountain townsendia	D	P	
VA	TOPA2	Townsendia parryi	Parry's townsendia	D	S	
VA	TRDO	Trifolium douglasii	Douglas' clover	D	D	
VA	TRPA28	Triglochin palustris	Slender bog arrowgrass	S		
VA	TRLAA2	Trollius laxus ssp. albiflorus	American globeflower	D		
VA	UTMI	Utricularia minor	Lesser bladderwort	D	S	

W-WNF = Occurrence on the Wallowa-Whitman National Forest

D =Species that have been documented on land owned or administered by the Wallowa-Whitman National Forest.
H =Historical records (exact location have not been confirmed or relocated).
S =Species that are suspected to occur on land within the Wallowa-Whitman National Forest.
P =Species that may possibly (but not as likely) occur on land within the Wallowa-Whitman National Forest.